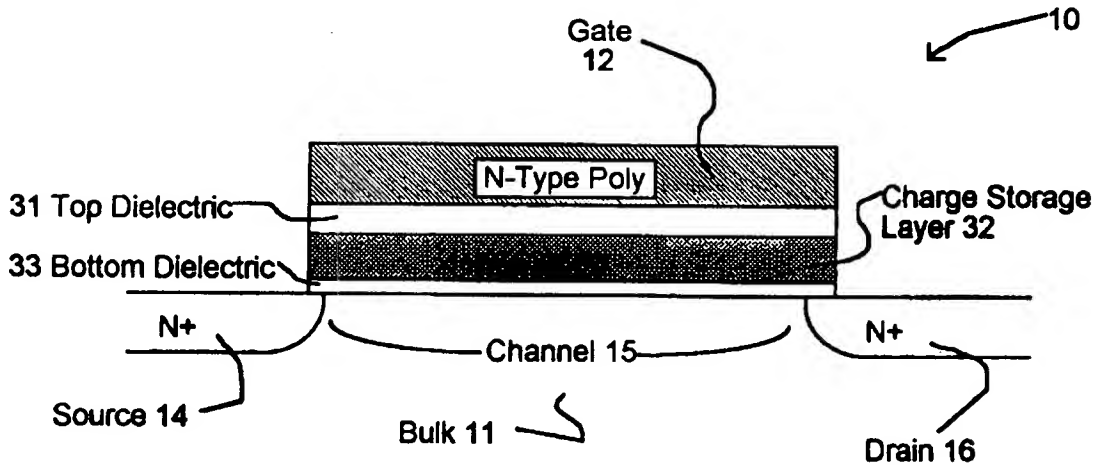
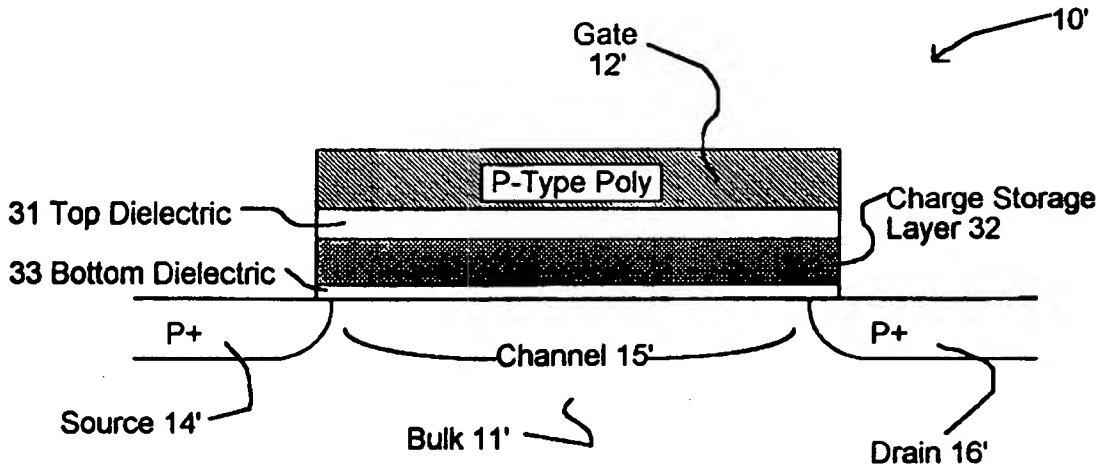


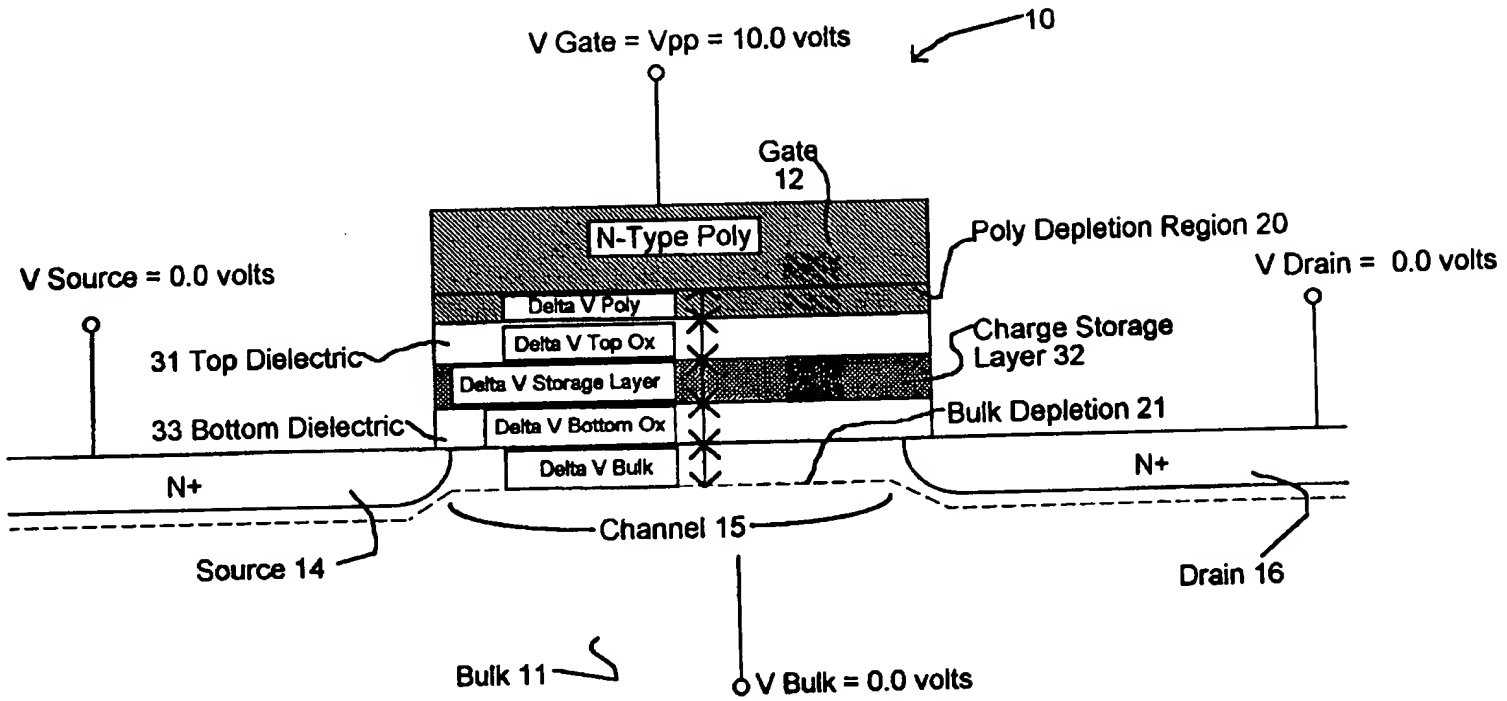
PRIOR ART

FIG. 1



PRIOR ART

FIG. 2



Delta_V_Poly + Delta_V_Top_Ox + Delta_V_Storage_Layer + Delta_V_Bottom_Ox + Delta_V_Bulk = Vpp

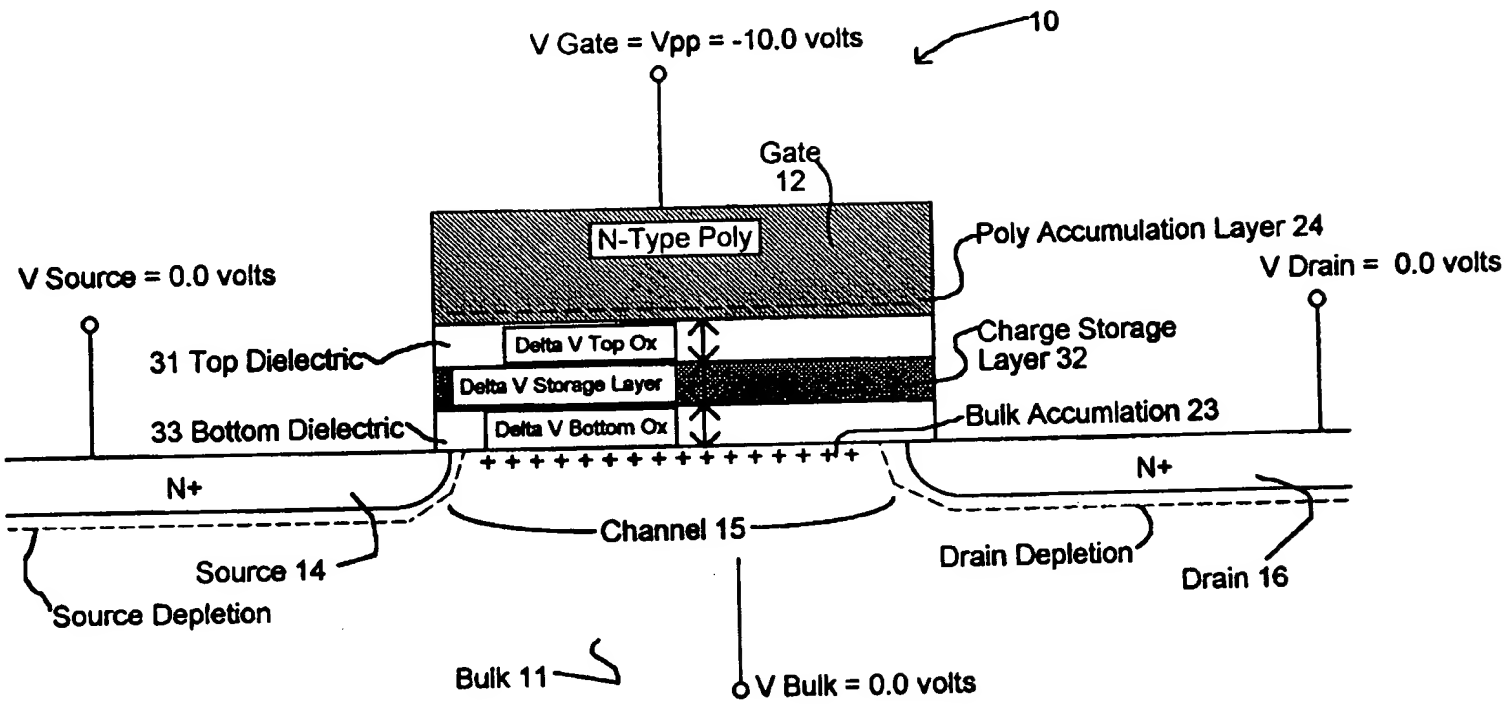
Ideally Delta_V_Poly << Vpp

When Delta_V_Poly is a small fraction of Vpp, e.g. 0.5 volts out of 10.0 volts, this leaving a healthy

Delta_V_Top_Ox + Delta_V_Storage_Layer + Delta_V_Bottom_Ox + Delta_V_Bulk = 9.5 volts

PRIOR ART

FIG. 3



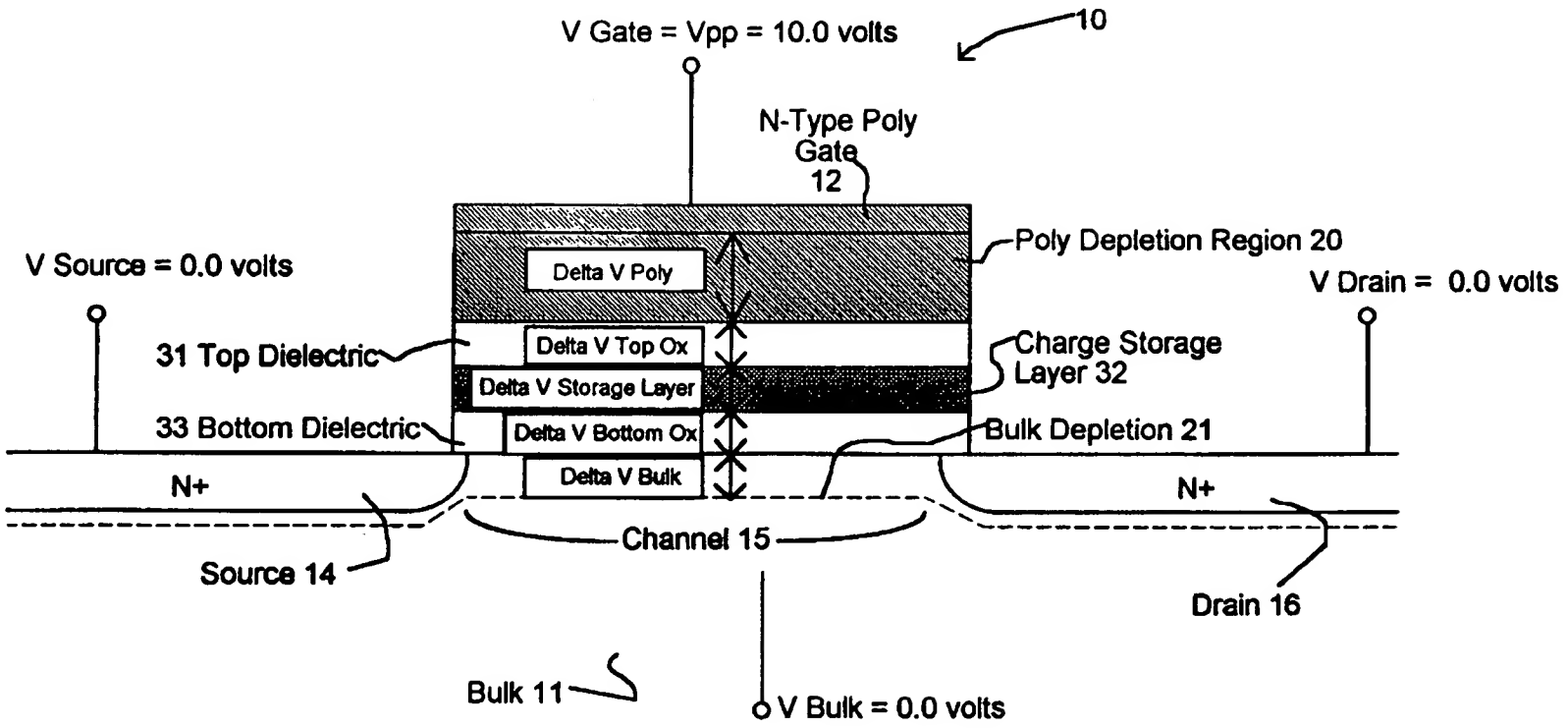
The Poly and Bulk Depletions are converted to Accumulation layers, so

this is an ideal situation where all of the applied voltage, Vpp, drops across the gate dielectric.

Delta_V_Top_Ox + Delta_V_Storage_Layer + Delta_V_Bottom_Ox = Vpp.

PRIOR ART

FIG. 4



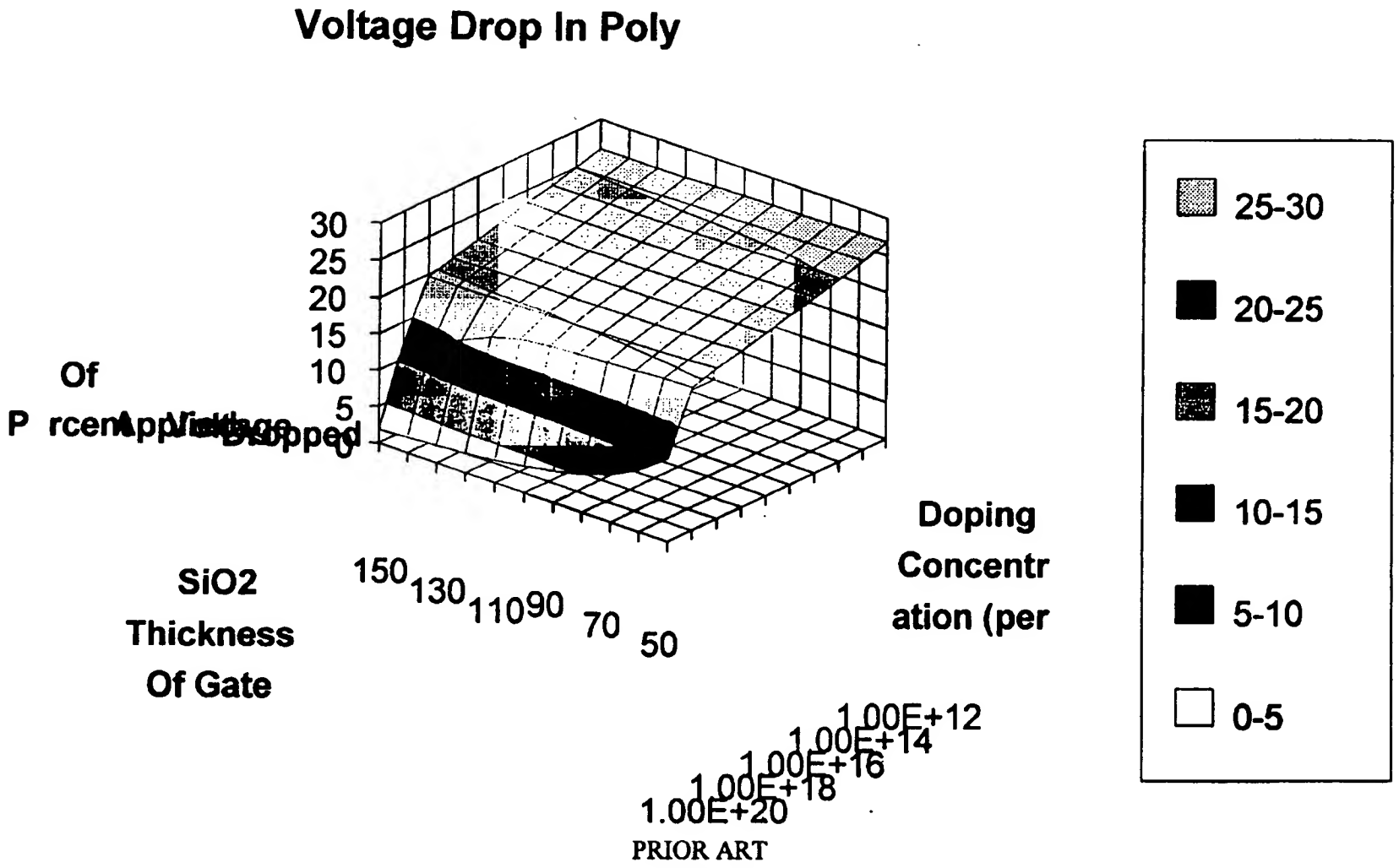
Delta_V_Poly + Delta_V_Top_Ox + Delta_V_Storage_Layer + Delta_V_Bottom_Ox + Delta_V_Bulk = Vpp

Delta_V_Poly is a large fraction of Vpp, e.g. 3.0 volts out of 10.0 volts, leaving only

Delta_V_Top_Ox + Delta_V_Storage_Layer + Delta_V_Bottom_Ox + Delta_V_Bulk = 7.0 volts

PRIOR ART

FIG. 5



PRIOR ART

FIG. 6

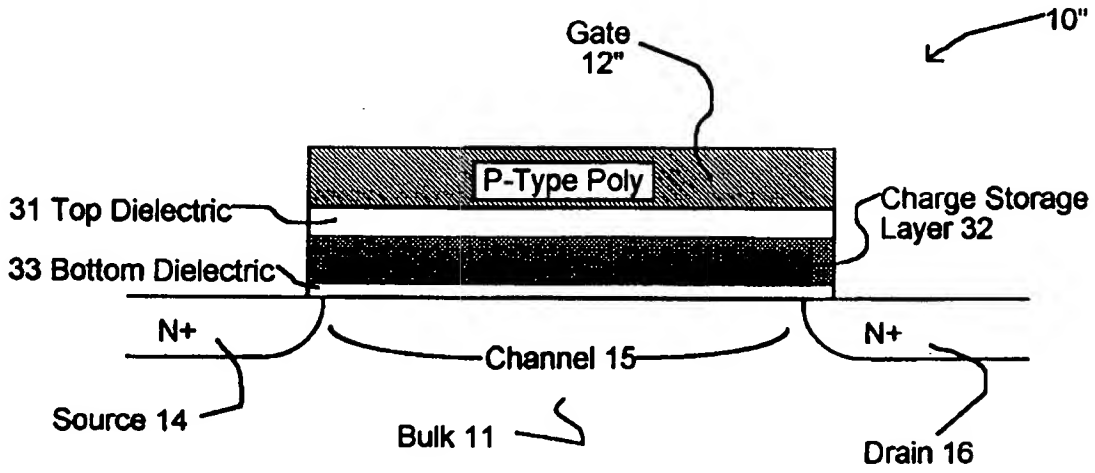

Gate
12"
10"
P-Type Poly
31 Top Dielectric
33 Bottom Dielectric
Charge Storage
Layer 32
N+
Channel 15
N+
Source 14
Bulk 11
Drain 16

FIG. 7

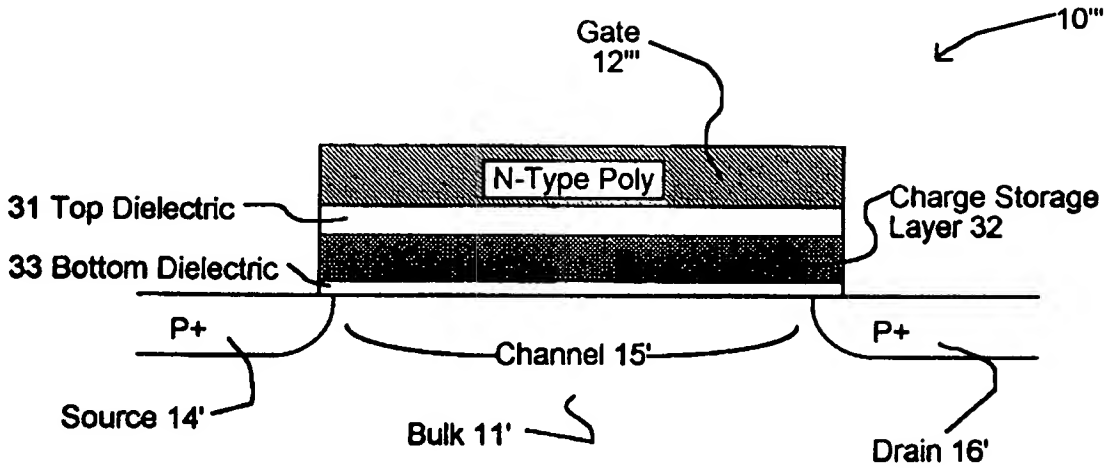
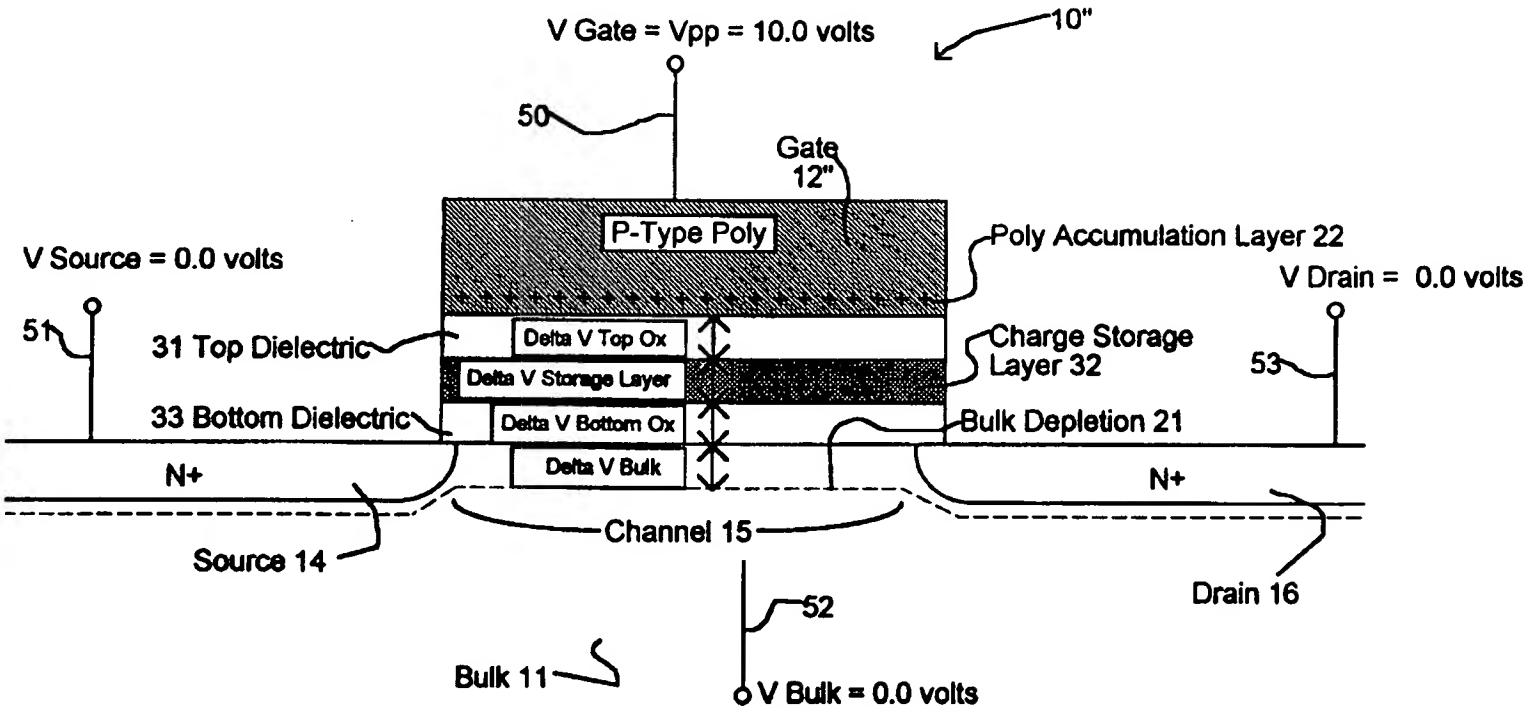


FIG. 8



Delta_V_Top_Ox + Delta_V_Storage_Layer + Delta_V_Bottom_Ox + Delta_V_Bulk = Vpp

FIG. 9

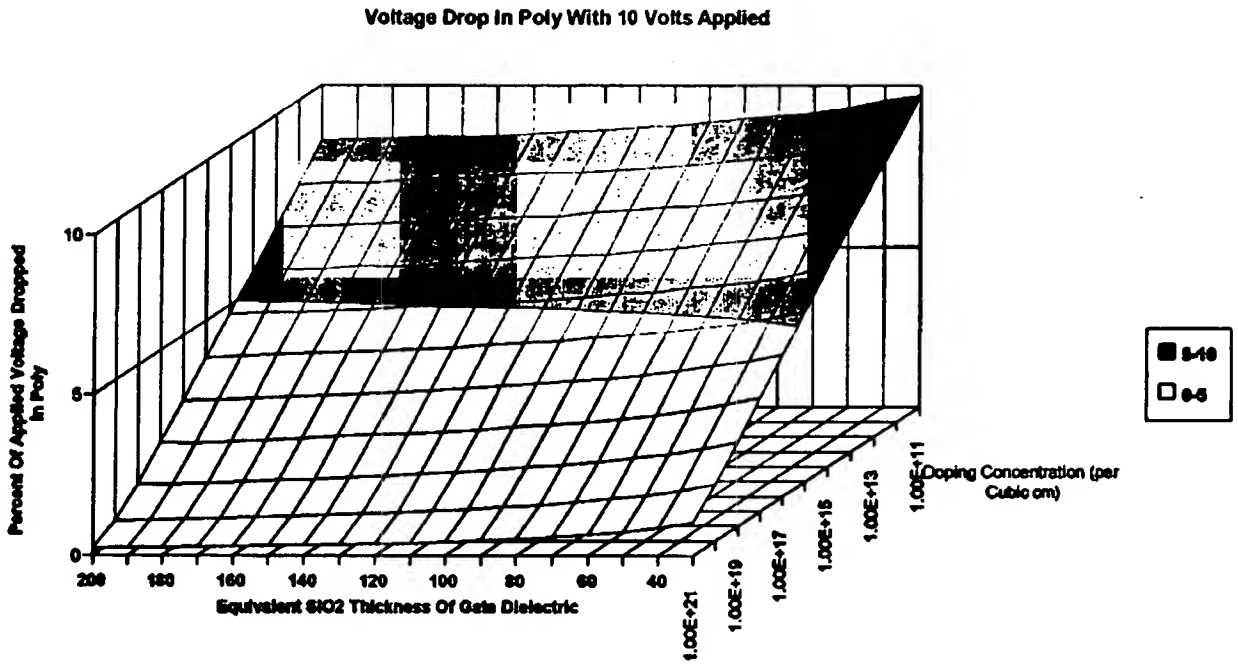
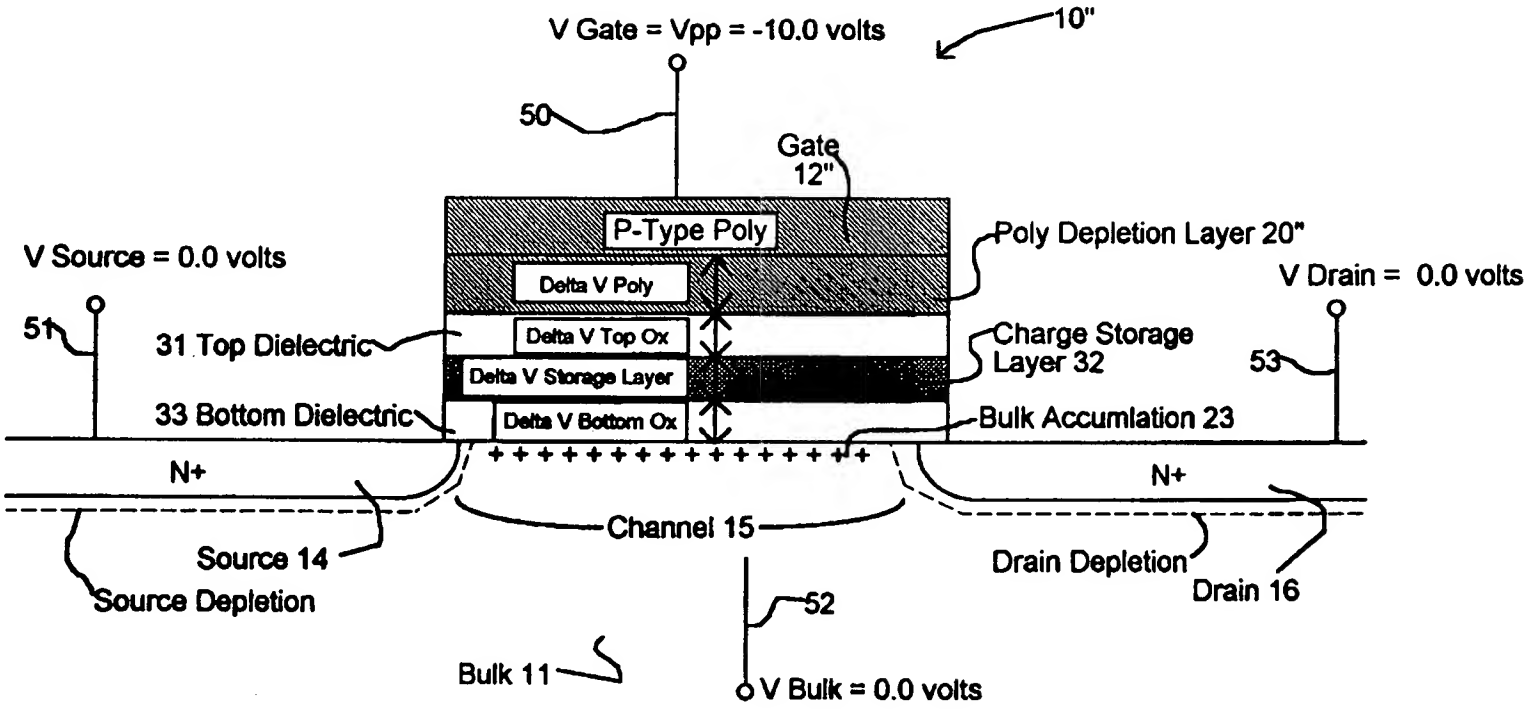

Voltage Drop In Poly With 10 Volts Applied
Percent Of Applied Voltage Dropped In Poly
10
5
0
200
180
160
140
120
100
80
60
40
Equivalent SiO2 Thickness Of Gate Dielectric
1.00E+21
1.00E+19
1.00E+17
1.00E+15
1.00E+13
1.00E+11
Doping Concentration (per Cubic cm)
S-10
S-5

FIG. 10



Even though a Poly Depletion exists, the Bulk Depletion Is converted to a Bulk Accumulation, so

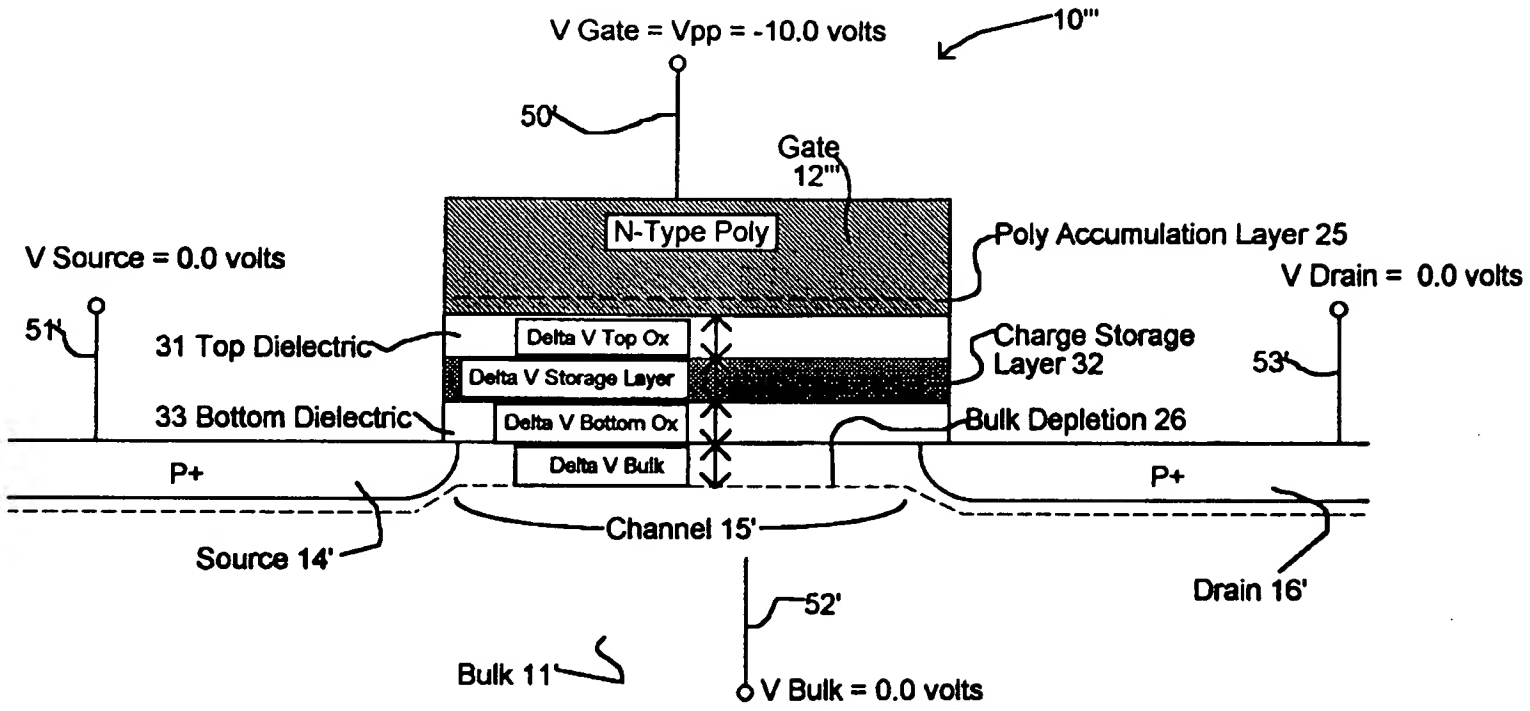
Delta_V_Poly + Delta_V_Top_Ox + Delta_V_Storage_Layer + Delta_V_Bottom_Ox = Vpp.

Ideally Delta_V_Poly << Vpp.

When Delta_V_Poly is a small fraction of Vpp, e.g. 0.5 volts out of 10.0 volts, this leaving a healthy

Delta_V_Top_Ox + Delta_V_Storage_Layer + Delta_V_Bottom_Ox = 9.5 volts.

FIG. 11



Delta_V_Top_Ox + Delta_V_Storage_Layer + Delta_V_Bottom_Ox + Delta_V_Bulk = Vpp

FIG. 12